REMARKS

Upon entry of this amendment, claims 1-20 are pending in the application, of which claims 1 and 9 are being amended, and claims 10-20 are being added.

The added claims and claim amendments are fully supported by the Specification and original claims and add no new matter. Thus, entry of the added claims and claim amendments is respectfully requested.

Rejection of Claims 1-8 under 35 USC 102 (e)

The Examiner rejected claims 1-8 under 35 USC 102(e) as being anticipated by Ross (USP 6,548,899).

This rejection is traversed because Ross et al. does not teach a method for treating a silicon nitride film to reduce a H content in the film by forming a silicon nitride film and electron beam treating the silicon nitride film at a sufficiently high electron dosage to reduce a H content in the silicon nitride film, as claimed in claim 1.

Instead, Ross et al. teaches a method of treating a surface of a cured dielectric film, with electrons to remove substantially all moisture and contaminants from the surface of the dielectric film. The surface electron treatment prepares the surface of the cured dielectric film for subsequent chemical vapor deposition of other layers on the surface of the cured and treated film. Specifically, in the Field of the Invention section, Ross teaches:

> The present invention relates to cured dielectric films and to a process for the treatment of the surface of such films to remove moisture and other contaminants therefrom. Such treatment is done by electron beam exposure of the dielectric surface in order to prepare it for a subsequent chemical vapor deposition of oxide, nitride or oxynitride layers.

The Examiner suggests that Ross et al. reads on the instant claim, because Ross et al. teaches electron beam treatment of the surface of a cured dielectric layer formed on a substrate, and because the substrate surface below the cured dielectric layer can have "an optional pattern of raised lines, such as metal, oxide, nitride or oxynitride lines which are formed by well known lithographic techniques. Suitable materials for the lines include silica, silicon nitride, titanium nitride, tantalum nitride, aluminum, aluminum alloys, copper, copper alloys, tantalum, tungsten and silicon oxynitride."

However, Ross et al. teaches only treatment of a surface portion of the cured dielectric film, and does not teach treatment of the underlying layers that are below the cured dielectric film thickness. Speciifcally, Ross et al. teaches:

> The film may also be cured by exposing the surface of the substrate to a flux of electrons. Whether the film is cured by electron beam exposure or is cured by other means such as heating or exposure to UV light, <u>the surface of the dielectric film is exposed to sufficient electron beam exposure</u> to remove substantially all moisture and contaminants <u>from the surface</u> of the dielectric layer. [Emphasis added.]

Ross et al. further teaches in the Abstract section that the electron treatment is for:

> ... [a] dielectric layer having a thickness of from about 2,000 to about 50,000 angstroms; heating a surface of the dielectric layer and exposing the dielectric layer to an electron beam radiation, <u>in which the electron beam radiation is concentrated at a distance within about 1,000 angstroms from the surface of the dielectric layer</u>, under vacuum conditions to remove substantially all moisture and/or contaminants <u>from the surface of the dielectric layer at a depth of up to about 1,000 angstroms from the surface of the dielectric layer</u>. [Emphasis added.]

Thus, since the optional silicon nitride layer taught by Ross et al. lies <u>below</u> the cured dielectric film, and since the electron beam treatment only reaches to less than 1000 angstroms of the 2000 to 50,000 angstrom thickness of the cured dielectric film, the electron treatment of the surface of the cured dielectric film does not reach the

underlying silicon nitride layer in a sufficient dosage to reduce the H content of the underlying layer. Furthermore, by teaching treatment of only the surface of the cured dielectric film and not the underlying silicon nitride layer is desirable, Ross et al. does not suggest or teach electron treatment of any optional underlying silicon nitride layer.

For these reasons, Ross et al. does not teach electron beam treatment of a silicon nitride film to reduce a H content in the film, as claimed in claim 1 and the claims dependent therefrom. Thus, the Examiner is respectfully requested to withdraw this rejection.

In addition, Ross does not teach added claim 19 which claims electron beam treatment of substantially an entire thickness of a silicon nitride film to reduce the H content through the thickness. As taught in the present Specification:

> The energy of the e-beam during the exposure is such that substantially an entire thickness of a layer of material is exposed to electrons from the e-beam, or predetermined portions of the layer beneath the surface of the layer are exposed to electrons from the e-beam. The exposure may also be accomplished in steps of varying energy to enable the whole layer, or portions of the layer to be exposed at predetermined depths.

Thus, claim 19 is also clearly not taught by Ross et al. because Ross et al. does not teach electron beam treatment of substantially an entire thickness of a silicon nitride film to reduce the H content through the thickness.

<u>Rejection of Claim 9 under 35 USC 102 (e)</u>

The Examiner further rejected claim 9 under 35 USC 102(e) as being anticipated by Inaba et al., "Increase of Parasitic Resistance in Shallow P+ Extension with SiN Sidewall Process and Its Improvement by Ge Preamorphization for Sub-0.25 mM p MOSFET", IEEE Trans. Elec. Dev., Vol. 46, No. 6, June 1999, pp. 1218-1224.

However, Inaba et al. does not teach amended claim 9 which reads on a method for fabricating a pMOSFET that comprises oxidizing a gate, forming a gate electrode, implanting to form shallow source/drain extensions, forming a SiN gate sidewall, electron beam treating the SiN gate sidewall with a sufficiently high electron dosage to reduce a H content of the silicon nitride film, implanting to form course/drain deep junctions, and activating the source/drain.

For a 102(e) rejection, a single reference has to disclose each and every element of the claim. Inaba does not disclose "electron beam treating the SiN gate sidewall with a sufficiently high electron dosage to reduce a H content of the silicon nitride film" as claimed in claim 9. Thus Inaba et al. does not anticipate claim 9.

The above-discussed amendments are believed to place the present application in condition for allowance. Should the Examiner have any questions regarding the above remarks, the Examiner is requested to telephone Applicant's representative at the number listed below.

Respectfully submitted,
JANAH & ASSOCIATES, P.C.

Date: February 23, 2005

By: ______________________
Ashok Janah
Reg. No. 37,487

Please direct all telephone calls to: Ashok K. Janah at (415) 538-1555.

Please continue to send correspondence to:

Patent Department, M/S 2061
APPLIED MATERIALS, INC.
P.O. Box 450A
Santa Clara, California 95052.